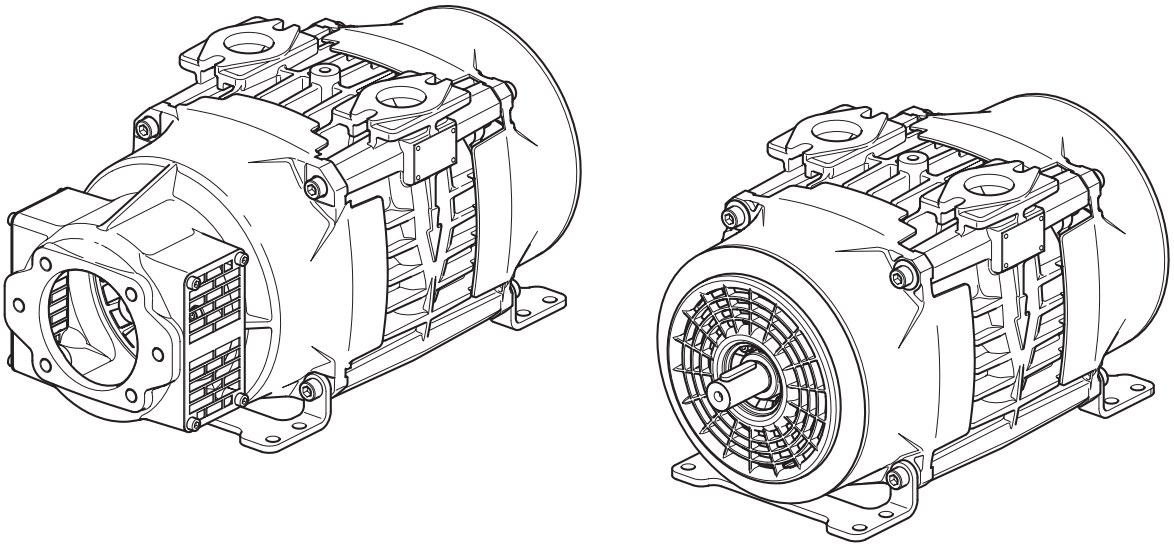
GHH RAND

Installation and Service Instructions

(Translation of the Original Instructions)

SV120



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Ingersoll Rand
Industrial Technologies

Introduction

Carefully read these Installation and Service Instructions prior to the installation and start of operation of the SV120 rotary valve compressor. These Installation and Service Instructions describe the structure and the first start of operations of the rotary valve compressor / compressor kits as well as the service work that needs to be carried out for maintenance/reconditioning.

Make sure that these Installation and Service Instructions are available to the staff and that work is performed in accordance with the instructions therein.

Scope of application of the Installation and Service Instructions

The Installation and Service Instructions exclusively contain information for the installation, start of operation and for the maintenance (service) of the SV120 rotary valve compressor in connection with the SV120 D and SV120 H compressor kits respectively.

The Installation and Service Instructions do not apply for the installation and the service of third party components through a third party installer.

Target group

These Installation and Service Instructions are limited exclusively to the utilization through trained specialists.

Notes and safety instructions

The following notes and safety instructions serve as a warning about hazards that may lead to operating errors, injuries and material damage.

Explanation of the signal words

DANGER
Identifies an immediately impending hazardous situation which may lead to death or serious injuries if it is not averted.

WARNING
Identifies a potential hazardous situation which may lead to death or serious injuries if it is not averted.

CAUTION
Identifies a potential hazardous situation which may lead to minor or moderately severe injuries if it is not averted.

NOTE
Identifies information or company policies that relate directly or indirectly to the safety of the staff or the protection of material assets.

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1 General

1.1 Application

GHH RAND builds and delivers the SV120 rotary valve compressor in the form of the SV120 D (Direct Drive) model as well as the SV120 H (Hydraulic Drive) model, including the respective accessories as kits for the installation on tank vehicles for a unit that is connection-ready.

Due to the oil-free compression of atmospheric air and the weight-to-power ratio, the compressor sets are used for the installation on tank vehicles for the compression-supported emptying of liquids when the utilization of feed pumps would be difficult or impossible, due to the fact that the direct contact of liquid/pump would cause problems.

The products built and supplied by GHH RAND are only designed for the operation at and on utility vehicles that exclusively drive on paved roads.
A different use requires the consultation with the manufacturing plant.

1.2 Manufacturer's address

GHH RAND
Schraubenkompressoren GmbH
Max-Planck-Ring 27
46049 Oberhausen

1.3 Machine data

The machine data is located on the type plate of the rotary valve compressor.

NOTE
The entire identification has certificate value and may not be changed or rendered illegible.

1.4 Information for enquiries and orders

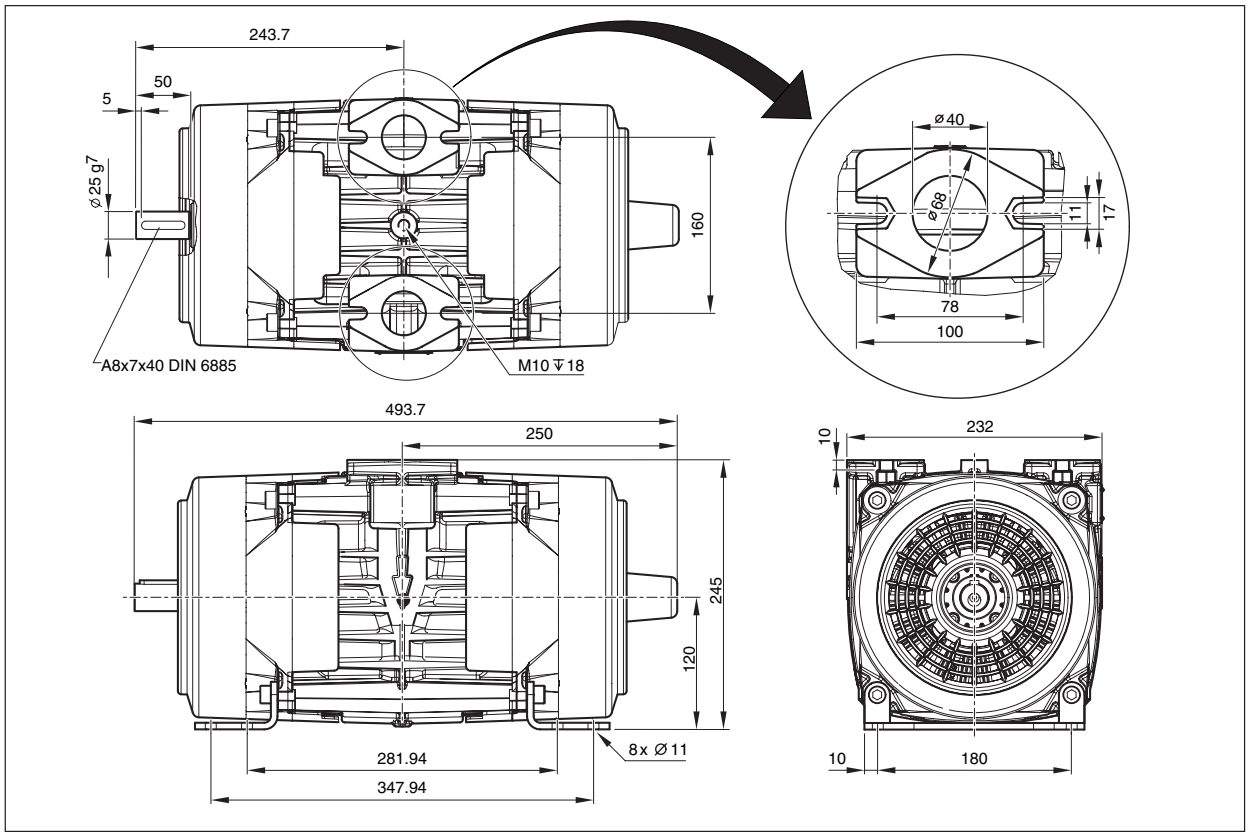
In conjunction with inquiries and orders of replacement parts and accessories, the exact type identification and the machine number of the compressor for which the replacement part or accessory is intended must be indicated.

WARNING
Original replacement parts and accessories that are authorized by the manufacturer represent safety factors. The use of non-original or non-authorized replacement parts and accessories may void the liability for the resulting consequences.

1.5 Service locations

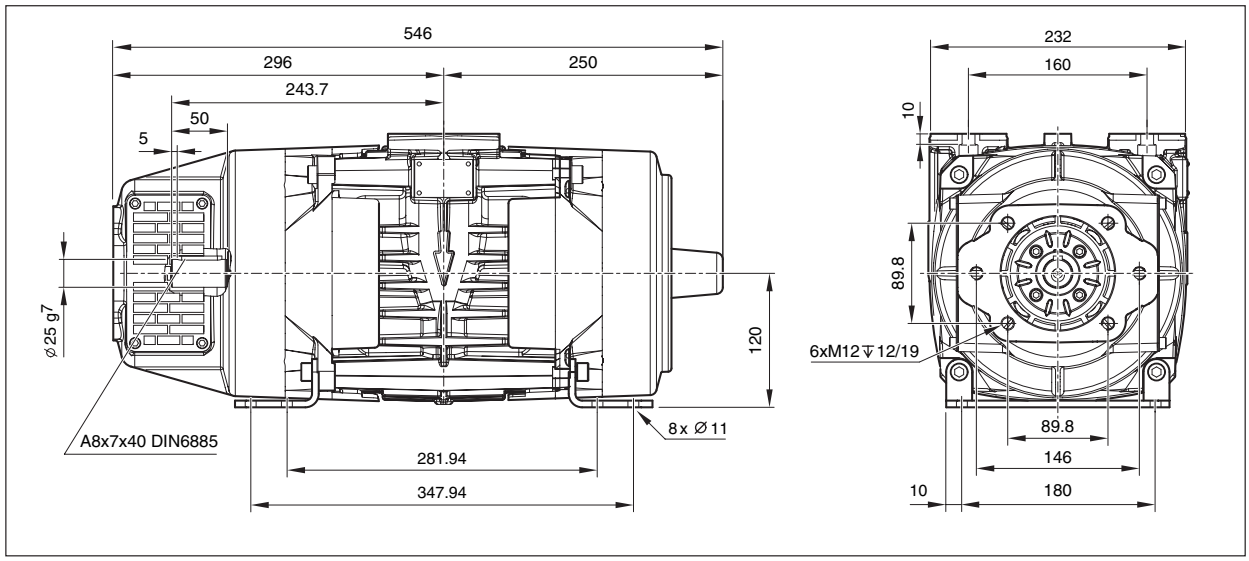
Addresses of the service locations can be found on the last page of these installation instructions or on the Internet page:
http://www.ghhrand.com

1.6 Technical data of the SV120 rotary valve compressor



Model: SV120 **D** (direct drive)

All measurements are approximate specifications.



Model: SV120 **H** (hydraulic drive)
Flange dimensions refer to SV120 D model

All measurements are approximate specifications.

Dimensions & weight

SV120…		…D	…H
Length (approx.)	mm	494	546
Width (approx.)	mm	232	232
Height (approx.)	mm	245	245
Weight (approx.)	kg	37	39

Rotational speed range

SV120	
min. min^{-1}/rpm	1000
max. min^{-1}/rpm	1800

Connection dimensions

Intake-/pressure flange:	DN40 / Ø68 - 2 x M10
Articulated shaft:	Only articulated shafts with two joints are permitted. Only balanced articulated shafts with a balancing quality of G 6.3 in accordance with DIN ISO 1940 with length compensation may be used.

Performance data

	Unit	SV120		
Rotary valve compressor	min^{-1} [rpm]	1000	1400	1800
Working gage pressure	**bar (g) [psig]**		**1.5 [15.0]**	
Intake volume	m³/h [cfm]	75 [50]	119 [76]	163 [102]
Coupling output	kW [hp]	5.0 [5.5]	7.1 [8.1]	9.8 [11.1]
Final temperature	°C [°F]	136 [229]	133 [231]	142 [247]
Intake temperature max.	°C [°F]	46 [115]	46 [115]	46 [115]
Working gage pressure	**bar (g) [psig]**		**2.0 [25.0]**	
Intake volume	m³/h [cfm]	65 [42]	109 [67]	152 [93]
Coupling output	kW [hp]	6.0 [7.3]	8.2 [10.1]	11.3 [14.0]
Final temperature	°C [°F]	164 [299]	157 [290]	166 [306]
Intake temperature max.	°C [°F]	46 [115]	46 [115]	46 [115]
Working gage pressure	**bar (g) [psig]**		**2.5 [36.0]**	
Intake volume	m³/h [cfm]	55 [32]	98 [58]	140 [83]
Coupling output	kW [hp]	7.0 [9.3]	9.3 [12.4]	12.9 [17.2]
Final temperature	°C [°F]	192 [375]	181 [356]	190 [372]
Intake temperature max.	°C [°F]	46 [115]	46 [115]	46 [115]
Final temperature with max. intake temperature	°C [°F]	240 [464]	227 [441]	238 [460]

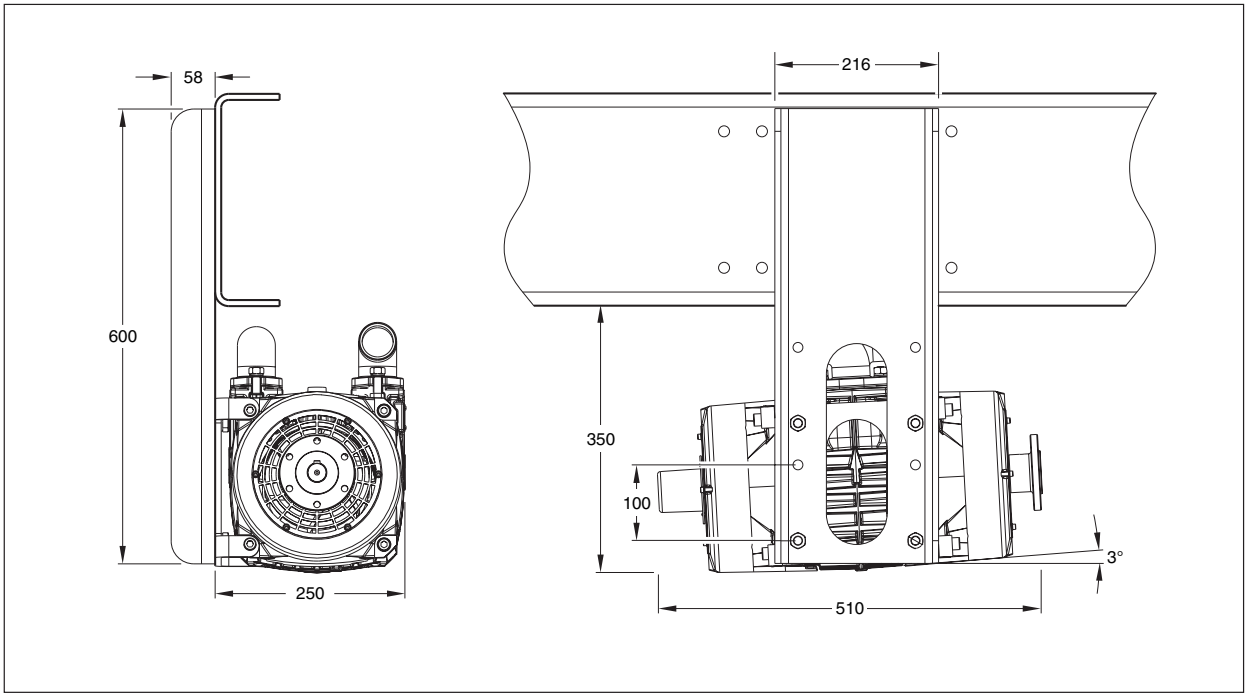
All information for:	
Feed medium:	atmospheric air
Intake pressure:	1 bar (abs.) [14.504 psia]
Intake temperature:	20 °C [68 °F]
Technical data without intake or pressure losses	

Maximum operating pressure:
2.5 bar (rel.) [36 psig]

Environmental conditions

Environmental temperature:
–25 to +46 °C [-13 to +111.8 °F]

1.7 Dimensions with the utilization of the optional installation console



Sample illustration for SV120 D model

All measurements are approximate specifications.

Dimensions

SV120 D/H with kit...		**...D**	**...H**
Length (approx.)	mm	510	546*
Width (approx.)	mm	250 (+58)	
Height (approx.)	mm	358**	

*	Length without hydraulic motor (optional)
**	Measurement from bottom edge of vehicle frame (with use of the optionally deliverable installation console; console can be shortened on the top)

1.8 Scope of delivery

Scope of delivery SV120 D kit

- SV120 D compressor
- 2 flange seals for intake and pressure flange at the compressor
- 1 articulated shaft flange (DIN or SAE)
- Air intake filter kit
  (intake filter with rain cap, mounting rubber pipe elbow [90°], pipe piece (aluminum), 4 hose clamps, service gage and hose connection fitting DN50 [straight / optional: 90° ungulate and pivotable])
- Spiral hose (length: approx. 1.5 m)
- Drive-side flange (pipe connection flange / weld flange)
- 1 check valve and 1 safety valve or 1 combined check/ safety valve

Optional:

- Overload coupling with shear bolt, usable for DIN and SAE-articulated shaft flange (incl. 2 shear bolt as backup)
- Installation console with compressor mount and mounting material
- Micro filter (for drive-side installation)

Scope of delivery SV120 H kit

- SV120 H compressor
- 2 flange seals for intake and pressure flange at the compressor
- 1 flexible shaft connection (coupling)
- Air intake filter kit
  (intake filter with rain cap, mounting rubber pipe elbow [90°], pipe piece (aluminum), 4 hose clamps, service gage and hose connection fitting DN50 [straight / optional: 90° ungulate and pivotable])
- Spiral hose (length: approx. 1.5 m)
- Drive-side flange (pipe connection flange / weld flange)
- 1 non-return valve and 1 safety valve or 1 combined non-return/ safety valve

Optional:

- Installation console with compressor mount and mounting material
- Hydraulic motor
- Micro filter (for drive-side installation)

2 Safety

2.1 General

These Installation and Service Instructions include basic notes that must be followed during the assembly, installation, and service. Therefore, these Installation and Service Instructions must be read in their entirely by the responsible specialized staff prior to the start of work.

2.2 Authorised personnel, training and qualification

WARNING
Installation work on the compressor / compressor kit may only be carried out by authorized, trained and qualified persons who are familiar with the applicable safety regulations. Repair work or modifications may only be performed by authorized personnel. The staff is available at anytime at the service sites or at GHH RAND.

2.3 Safety-conscious work

The safety-related regulations that are relevant for the installation, operation and maintenance of air compressors can be found in the following publications:

Standards, in particular:

DIN EN ISO 12100	Safety of machinery
DIN EN 1012-01	Compressors and vacuum pumps, safety requirements

In addition, the following regulations and guidelines must be adhered to

– Product-related safety data sheets, especially in regard to explosion hazards, handling and storage

– Technical rules for hazardous materials (TRHM)

– Technical rules for operational safety (TROS)

In this context, the respectively last applicable versions of these regulations shall be authoritative.

WARNING
Special legal provisions and regulations, particularly safety regulations, that may apply in your company or due to local conditions must also be adhered to. In case of competing regulations, the more restrictive provisions shall be applied. Also adhere to the national regulations that apply in the respective country in which the installation takes place.

2.4 Unauthorised conversions and spare parts

Modification and changes on the compressor / compressor kit are prohibited.
Damage to the seal will void any warranty claims.
Original replacement parts and accessories that are authorized by the manufacturer represent safety factors.
The use of non-original or unauthorized replacement and accessory parts may void the liability for resulting consequences.

2.5 Incorrect operating methods

Without the approval of GHH RAND, compressors / compressor kits may not be operated under any other conditions than those listed in Chapter 1.6 "Technical data".

WARNING
The operation of compressors / compressor kits under conditions that are not intended may lead to serious injuries and significant material damage.

2.6 Disposal

NOTE
Properly dispose of operating materials and components in an environmentally-safe way.

3 Installation guidelines

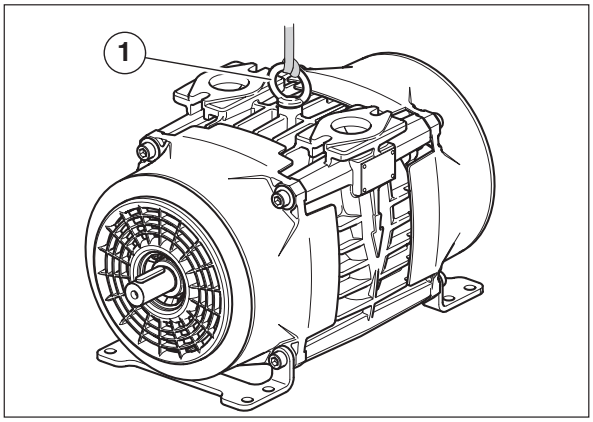
NOTE
In principle, the installation guidelines of the manufacturer for the respective vehicle must be adhered to in addition to the specifications of this Installation and Service Instruction.

3.1 Internal transportation

The rotary valve compressor and the accessories are delivered separately.

The rotary valve compressor sits on a pallet and is fastened with tension straps.
The additional parts of the kit are delivered in a separate box.

WARNING
Use a sufficiently dimensioned lift truck or forklift for the internal transport.



To transport the compressor with a crane, it is possible to screw an eye bolt (1) into the threaded drill hole between the connection flanges on the top of the compressor.

WARNING
Use sufficiently dimensioned lifting accessories. Do not lift the compressor by the plastic covers that are attached to the sides.

3.2 Drive options

CAUTION
No radial forces may be transmitted to the drive shaft of the compressor; actuation with a V-belt drive is therefore prohibited. To avoid damage to the compressor, it must be ensured that the required operating speed is achieved promptly.

SV120 D kit (D : direct drive)

The SV120 D rotary valve compressor that is supplied with the kit is intended for a direct actuation from a power take-off via a articulated shaft.

The installation of a safety coupling is recommended for the protection of the drive (gear unit).
An overload coupling with shear bolt can be supplied as an option (refer to Chapter 1.8).

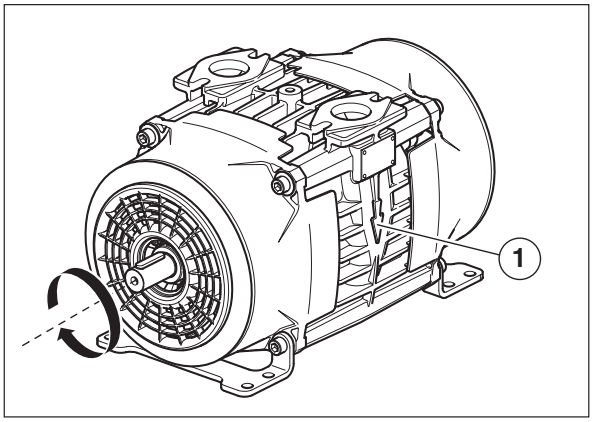
SV120 H kit (H : hydraulic drive)

The SV120 H rotary valve compressor that comes with the kit is intended for an actuation through a hydraulic motor via a flexible coupling.
It is possible to attach a hydraulic motor, which can be supplied as an option, through a flange at the cover on the drive side of the compressor; the drive shafts are connected with each other via the flexible coupling.

3.3 Preparing installation

3.3.1 Rotation direction control / change of rotation direction

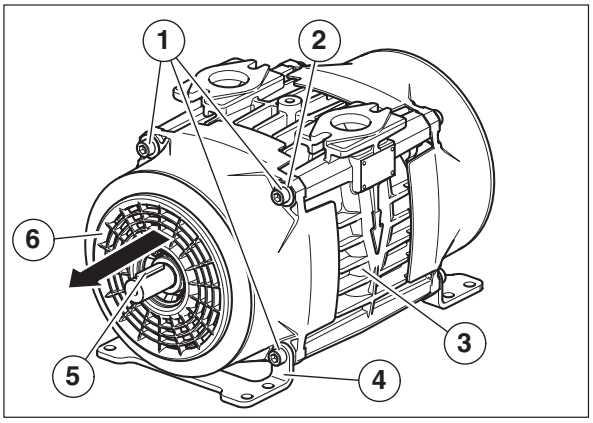
CAUTION
The rotary valve compressor may only be turned in the direction as indicated by the arrow (1) on the casing. Even short-term turning against the stipulated rotation direction can result in major damage to the compressor.



- Check the rotation direction of the drive:
  The arrow (1) in the compressor casing indicates the required rotation direction of the drive shaft.

If the rotation direction of the compressor is not the same as the rotation direction of the drive, the rotation direction of the compressor must be changed by switching the covers to the respective other side.

Exchanging of the covers:



- Unscrew the hexagon socket screws (1) [total of 4], take footer (4) and cover (6) off the compressor (3).
- Take fitted key (5) out of the shaft and insert it into the slot at the other end of the shaft.

CAUTION
The fitted key slot in the shaft has sharp edges. Wear appropriate protective gloves.

- Reinstall the covers on the opposite ends.
  Apply installation paste (ceramic based, heat resistant up to +250°C) to the hexagon socket screws (1), insert them and tighten them with the specified torque.

  Tightening torque (M10 10.9):
  58 Nm/42.8 lbf ft

CAUTION

Do not use washers on the cover for the hydraulic drive (only SV120 H).

Do not tighten hexagon socket screws applying more than the specified torque, because the compressor housing may otherwise be damaged.

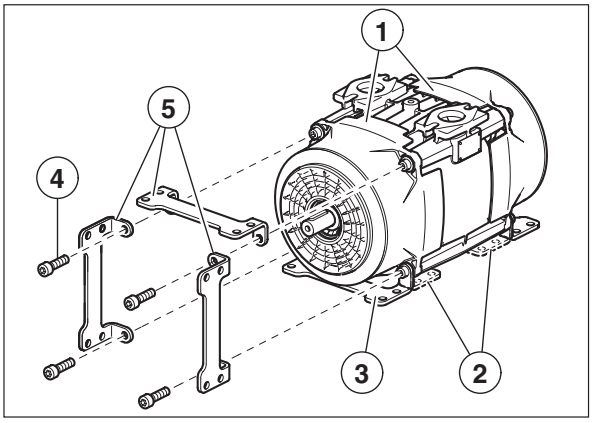
The powering now takes place at the other end of the shaft of the compressor, the drive rotation direction is running counter-clockwise.

NOTE

Prior to the reattachment of the footers it needs to be determined which direction the connection flanges of the compressor should point to in the installed condition, because the footers can optionally be installed so that they are off-set on the compressor by 90° respectively, see Section 3.3.2.

in conjunction with a change of the drive rotation direction it needs to be ensured that afterwards the flanges for the installation of the vacuum and the pressure line are located on the respectively opposite side.

3.3.2 Installation options for the footers / Orientation of the compressor connections



The attachment footers (3) can be installed so that they are offset respectively by 90° between 2 fastening screws (4) of the covers (1) (installation position see Pos. 5).
If necessary, the footers can also be installed on the compressor so that they are turned by 180° (see Pos. 2) to achieve a closer spacing of the mounting drill holes on the vehicle.

CAUTION

Do not use washers at the mounting points of the footers.

No washers are used either for the other two mounting screws on the cover for the hydraulic drive (only SV120 H).

NOTE

If the optional installation console is used, a mounting plate is installed in lieu of the footers. The mounting plate is screwed to the installation console which is attached to the vehicle, see Chapter 3.6.

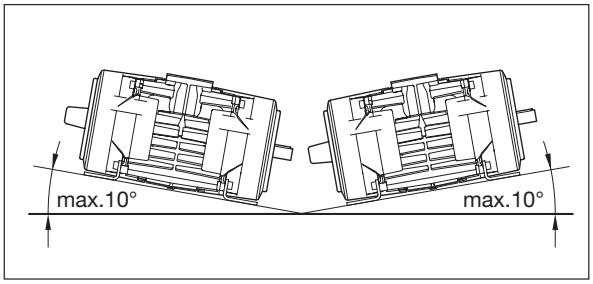
3.3.3 Installation site

The approximate position of the compressor on the vehicle must be determined prior to the installation considering the following framework conditions.

Required space conditions

- Check required space on the vehicle considering the respective dimensions (see Chapter 1.6 "Technical data for SV120 rotary valve compressor" and Chapter 1.7).
- To ensure sufficient cooling of the compressor, the space between the front covers and other parts should measure at least 20 cm.
- Consider the orientation of the compressor and the respective space requirement for the connection of the intake and the pressure line.

Orientation / flange parallelism



NOTE
The maximum permissible inclined position of the rotary valve compressor in longitudinal direction during the operation is +/– 10°.

For the SV120 D compressor, plan, if possible, for an installation and orientation on the side of the power take-off in a right angle to the vehicle.
The optional installation console already comes with a flange fitting of 3° to achieve flange parallelism (see illustration in Chapter 1.7 "Measurements in conjunction with the use of the optional installation console").

3.3.4 Selecting the articulated shaft (only SV120 D kit)

Consider the following items during the determination of the articulated shaft:

- Choose the appropriate length for the jointed shaft taking into consideration the fitting dimensions and observing the maximum extension length.

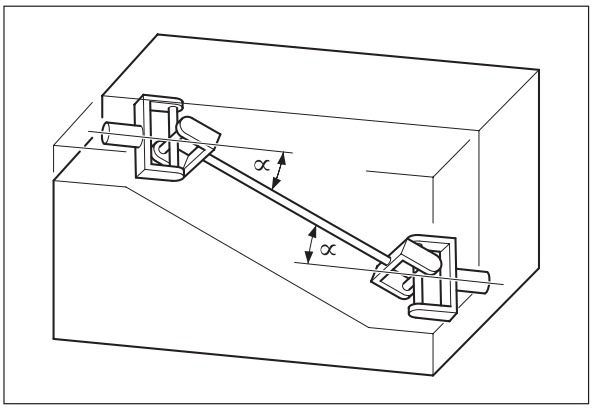
CAUTION

The maximum permissible expansion length of the articulated shaft must be looked up in the operating instructions of the articulated shaft manufacturer and must be adhered to during the installation.

WARNING

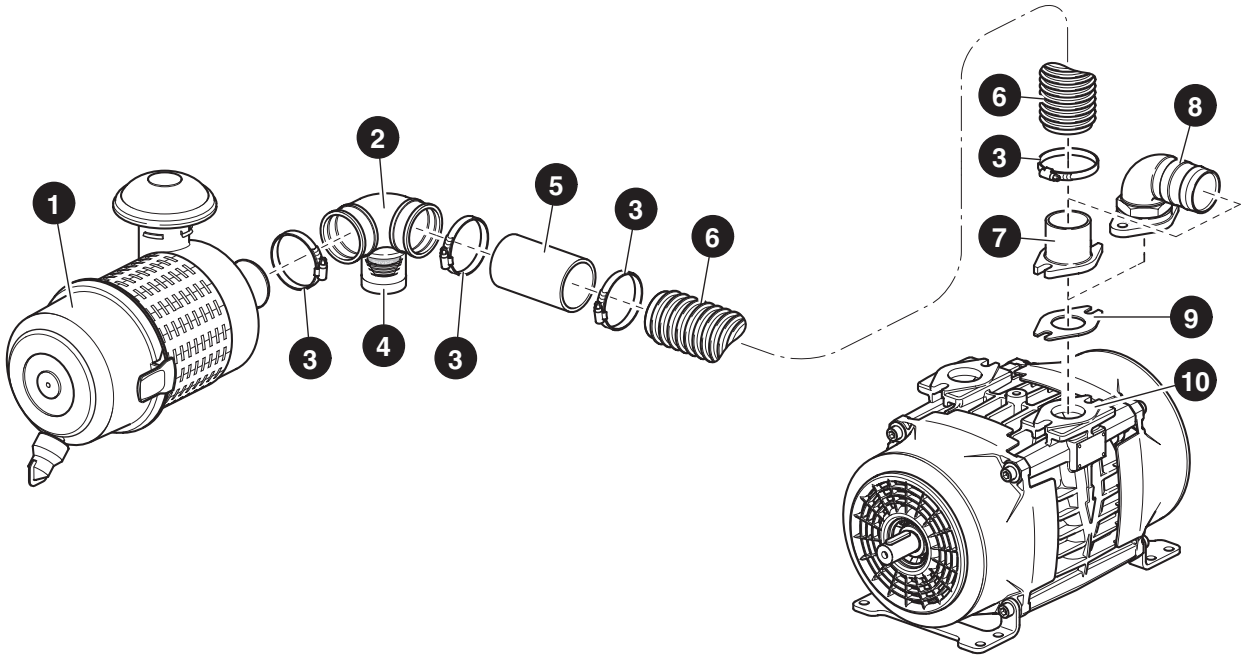
As a matter of principal, the manufacturer's structural guidelines for the respective vehicle and the technical information provided by the articulated shaft manufacturer in regard to the mounting, flange parallelism and inclination angle of the articulated shaft must be adhered to.

The total inclination angle α of the articulated shaft shall not exceed 12°. 15° are permissible in exceptional cases.



3.4 Air intake

Component overview



❶	Air filter	❻	Spiral hose
❷	Rubber pipe angle (90°)	❼	Hose connection fittings, straight
❸	Hose clamp	❽	Hose connection fittings, 90°, pivotable (optional, instead of Pos. 7)
❹	Service gage	❾	Flange seal
❺	Pipe piece	❿	Intake flange on the compressor

The intake air must be cleaned through the air filter that is included in the kit. A paper filter should be chosen as the filter material.

Air flow / filter installation location

CAUTION
The air intake must not be located in the area of warm air or emitted hot exhaust fumes. If necessary, the exhaust system of the vehicle or the installation location of the air filter must be moved. Temperature damage may be caused to the compressor in case of non-adherence.

Connection line, service gage

The air intake line (spiral hose included in the kit) is connected to the air filter via a 90° elbow fitting which the intake service gage is mounted onto.

NOTE
Consider the accessibility and readability of the service gage when determining the installation location of the air filter.

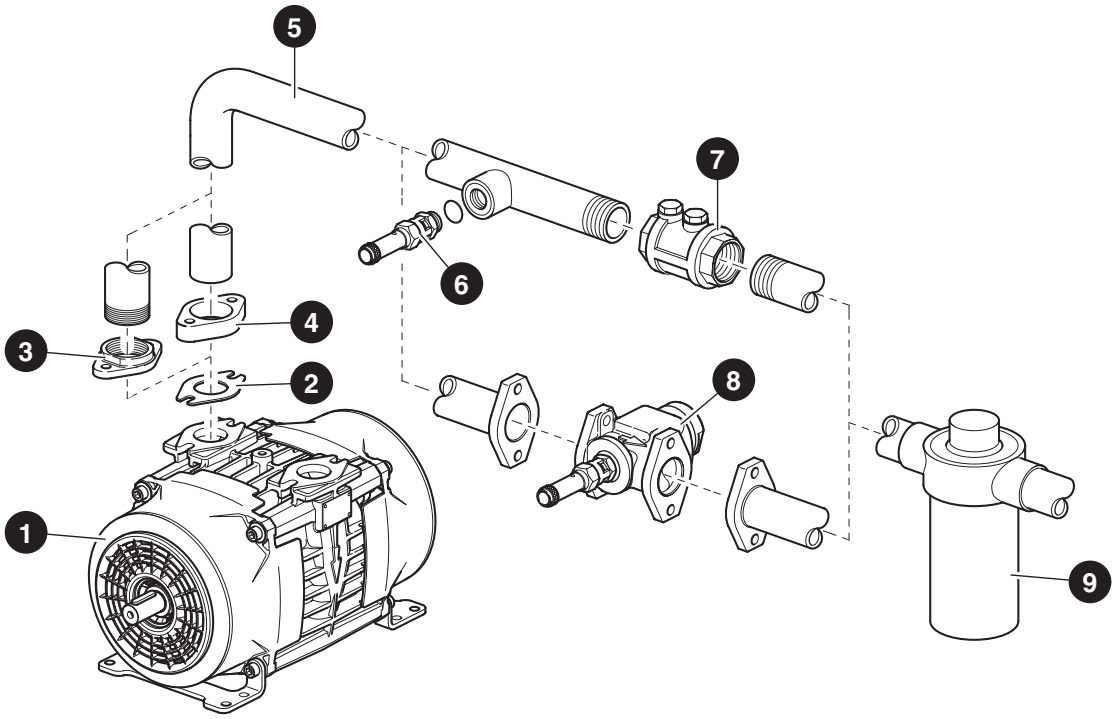
The connection of the air intake line at the compressor takes place via a hose connector fitting (straight or with 90° angle and pivotable).

NOTE
To prevent a loss of pressure, the nominal width (DN 50) of the connection line for the air intake filter may not be reduced, and the length of the connection line should be kept as short as possible.

CAUTION
If a fixed piping is intended in lieu of the spiral hose, it needs to be ensured that only pipes made of non-corroding material (e.g. aluminum) are used. Otherwise there is a risk that rust germs may enter the compressor and that the rotor may start to rust. Only the non-electricity conductive flange seals that come with the kit may be used on the compressor flanges - risk of corrosion!

3.5 Drive-side facilities

Component overview



❶ SV120 Rotary valve compressor
❷ Flange seal
❸ Pipe connection flange
❹ Weld flange
❺ Pressure line
(not included in the total price)
❻ Safety valve
❼ Non-return valve
❽ Combined non-return valve and safety valve (in lieu of Pos. 6 and 7)
❾ Micro filter (optional)

The connection of the pressure line at the compressor takes place via the pipe connection flange that came with the kit of the welding flange (optional)

3.5.1 Non-return valve

The non-return valve that is included in the kit must be installed in the pressure line to the tank as a means of protection for the compressor.
The non-return valve is to prevent a reverse motion of the rotary valve compressor.
It is not used to prevent material rebounds; for that, respective features must exist on the vehicle side.

WARNING
Adhere to the flow direction of the non-return valve (arrow in the casing). Do not mount the safety valve facing downwards.

NOTE
The non-return valve that is installed in the compressor kit has the purpose to prevent a longer fast reverse motion of the compressor after shut-off that is due to an existing residual pressure in the air pressure lines of the pneumatic system as well as in the tank.

NOTE
To prevent an unintended material rebound, an additional non-return valve (or a non-return flap) is mandatory to be intended in the pneumatic system of the silo construction.

3.5.2 Safety valve

To secure the compressor and the safety valve that comes with the kit must be installed between the compressor and the non-return valve.

WARNING
To ensure a proper function, the safety valves must not be installed facing downwards. The length of the pressure line to the safety valve may measure no more than 1 m [3.3 ft].

The pressure line to the safety valve should be kept as short as possible.

WARNING
The safety valve must be the first component in the pressure line behind the compressor. The improper placement of the safety valve my lead to the total damage of the compressor as well as to personal injury. The safety valve that comes with the compressor kit is only used to protect the compressor against exceeding the permissible pressure. The tank/ pressure container must be secured separately.

CAUTION
The release of the safety valve may lead to injuries or damage due to emerging hot air. Install the safety valve so that potentially emerging hot air is not directed toward operating personnel or sensitive machine components. It is not permitted to use the safety valve as an exhaust regulation valve.

3.5.3 Non-return valves and safety valve combination

As an alternative to the individual valves, there is also a combined non-return valve and safety valve.
The explanations and notes in the sections for the individual valves (refer to Chapter 3.5.1 and 3.5.2) must also be adhered to.

3.5.4 Micro filter

In cases when the product that is to be transported may not come in contact with dust particles from the compressor (abrasion of the separation valve), a micro filter must be installed in the pressure line behind the non-return valve (available as optional delivery).

3.5.5 Ball valve

A ball valve should be installed in the pressure line before the non-return valve (not part of scope of delivery, diameter at least 1/2"), so that the compressor can be started and turned off without potential back-pressure.

3.5.6 Pressure line

The pressure line must be mounted on the vehicle with elastic fasteners to prevent tension as well as the transmission of vibrations as much as possible.
Flexible elements should be intended in the pressure line, so that the torsions of the vehicle frame as well as the thermal expansion of the pressure lines can be compensated.

CAUTION
The pressure line will become very hot during the operation of the compressor! Lay the pressure line preferably in such a way that it cannot be accidentally touched. Respective safety stickers can be affixed on the pressure line (see Chapter 4). Easily flammable materials may not get in contact with the pressure line.

CAUTION
Only the non-electricity conductive flange seals that come with the kit may be used on the compressor flanges - risk of corrosion!

3.6 Mounting

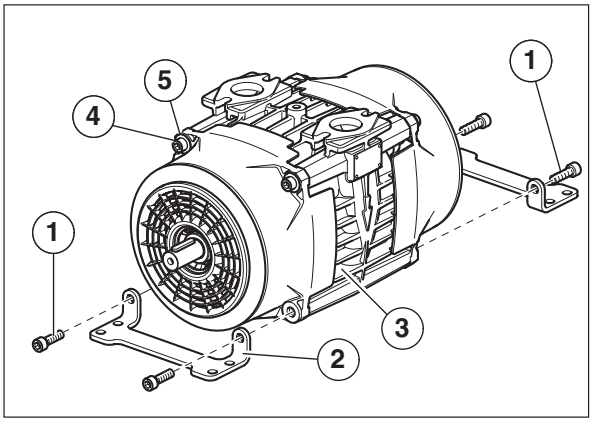
NOTE

The installation is shown through the example of the installation console that can be delivered as an option.

WARNING

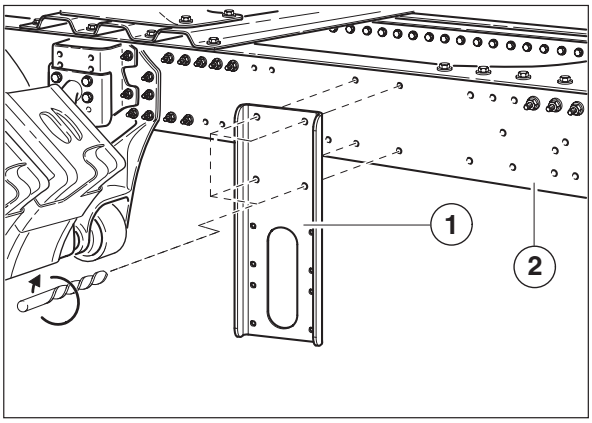
If not indicated otherwise, installation paste (ceramic base, heat-resistant up to a min. of +250°C/482°F) must be applied to all fastening screws on the compressor before they are re-inserted.
Therefore the following work steps therefore waive this notice.

- Specify compressor installation based on the space requirement (see Chapter 1.6 and 1.7); adhere to max. angle for the articulated shaft and space requirements for the installation of the hydraulic drive (only SV120 H).
- Determine direction of the compressor (position of the connecting flanges) and modify footers respectively (see Chapter 3.3.2), or if the compressor is to be attached to the optional installation console, you must detach the footers from the compressor. In this respect:



- Loosen Fastening screws (1, 4 pieces) of the feet (2).
- Attach fastening screws (4) with discs (5) in the other fastening points at the compressor (3), so that the two sides remain open for the installation at the installation console (or the holding plate) remain open.

  Tightening torque (M10x40 10.9):
  58 Nm / 42.8 lbf ft



- Position installation console (1) at the vehicle frame (2), so that the drive flanges are parallel.

NOTE

The installation console features a flange adjustment of 3° (see Chapter 1.6).
To achieve flange parallelism, the installation console must be positioned respectively with regard to the vehicle frame in conjunction with different slopes of the power take-off flange.

If the installation console is to be mounted at a height where it protrudes beyond the vehicle frame, the installation console can be respectively reduced at the top.

- Installation location and drilling holes in the console.
  For a pre-drilled vehicle frame, transpose the drill pattern of the vehicle frame to the backside of the installation console.

WARNING

Fit the installation console with at least 4 drill holes Ø 14.5 mm (min. screw size: M14 10.9, hexagonal bolt screws with shaft.)

The placement of the hole pattern can be different based on the respective vehicle frame. Use the largest hole spaces.

- If the vehicle frame was not drilled (sufficiently) at the factory, initially drill holes according to the vehicle manufacturer's installation guidelines and the dimensions of the mounting console on the vehicle frame. Transpose the hole patterns of the vehicle frame onto the backside of the installation console.

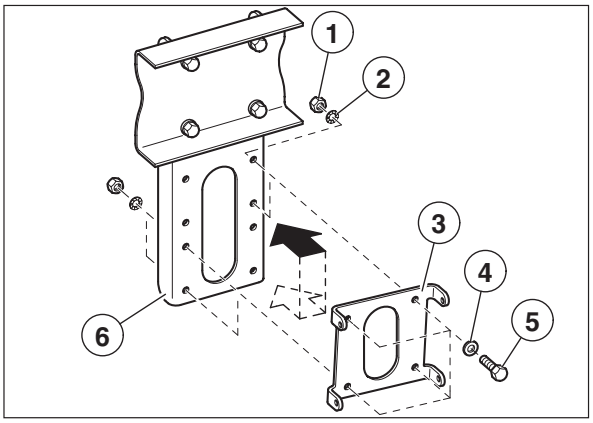
WARNING
Some vehicle frames must be reinforced in the area that is to receive the installation console in accordance with the construction guidelines of the manufacturer.

NOTE
Compensate for potentially existing slopes of the frame, an off-set frame or auxiliary frame by using a base plate or wedges.

WARNING
No welding work must be carried out on the vehicle frame

- Drill holes for the fastening screws according to the markings on the mounting console.
- Fasten installation console with hexagon screws M14 10.9 with shaft with the vehicle frame.

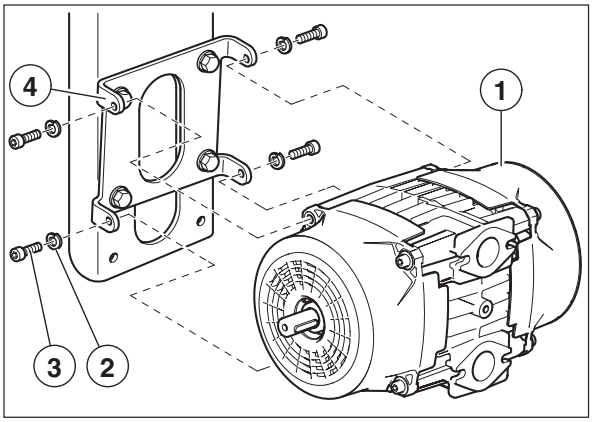
  Tightening torque (M14 10.9):
  180 Nm / 133 lbf ft



- Attach fastening plate (3) with screws M12×35 (5), plates (4), wedge locking washers (2) and screw nuts (1) on the installation console (6).

  Tightening torque (M12x35 8.8):
  82 Nm / 60.5 lbf ft

NOTE
As shown in the illustration with the double arrow, the fastening plate can be attached on the installation console at two different heights. The dashed lines respectively show the upper and lower installation position of the fittings.



- Attach compressor (1) with spring washers (2) as well as the screws M10×40 10.9 (3), which were previously used to attach the footers, onto the fastening plate (4).

  Tightening torque (M10x40 10.9):
  58 Nm / 42.8 lbf ft